

IN THE CLAIMS:

Claims 12 through 32 were previously cancelled. Claims 1 through 11 and 33 through 41 have been amended herein. All of the pending claims are presented below. This listing of claims will replace all prior versions and listings in the application. Please enter these claims as amended.

Listing of Claims:

1. (Currently amended) A thermoplastic elastomer having A blocks and B blocks and being present in a solid state suitable for use as a binder for at least one of a propellant, explosive, and gasifier, the thermoplastic elastomer being formulated from a composition comprising, as constituents:

A blocks terminated with isocyanate-reactive groups derived from monomers comprising at least one member selected from the group consisting of oxetane derivatives and tetrahydrofuran derivatives, the A blocks being crystalline below about 75°C;

B blocks terminated with isocyanate-reactive groups derived from monomers comprising at least one member selected from the group consisting of oxetane and derivatives thereof, tetrahydrofuran and derivatives thereof, and oxfrane and derivatives thereof, the B blocks being amorphous above about -20°C; -20° C; and

linking groups derived from at least one diisocyanate for end-capping the A blocks and the B blocks and at least one difunctional oligomer comprising two functional groups which are reactive with isocyanate moieties of the at least one diisocyanate.

2. (Currently amended) ~~A-~~ The thermoplastic elastomer as defined in claim 1, wherein:

the at least one diisocyanate contains a first isocyanate moiety which is at least five times more reactive ~~with the~~ with terminal groups of the blocks than a second isocyanate moiety thereof, ~~whereby~~ wherein the more reactive first isocyanate moiety is capable of reacting with

~~and end-capping~~ end-capping the terminal groups of the blocks, leaving the less reactive second isocyanate moiety free and unreacted; and

the at least one difunctional oligomer has two isocyanate-reactive hydroxyl groups which are sufficiently sterically unhindered to be reactive with the free and unreacted second isocyanate moieties of the end-capped blocks.

3. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 2, wherein the at least one diisocyanate comprises 2,4-toluene diisocyanate.

4. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the A blocks are crystalline below about 60°C.

5. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the at least one difunctional oligomer comprises a reaction product of at least one diol and at least one diisocyanate, the at least one diol being selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol, and 1,4-cyclohexanedimethanol, and any combination thereof.

6. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the at least one difunctional oligomer comprises a reaction product of at least one diol and at least one diisocyanate, the at least one diisocyanate being selected from the group consisting of hexane diisocyanate, methylene-bis(4-phenyl isocyanate), phenylene diisocyanate, toluene diisocyanate, and xylylene diisocyanate, and any combination thereof.

7. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the thermoplastic elastomer has a weight average molecular weight of at least 40,000 and a number average molecular weight of at least 10,000.

8. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the thermoplastic elastomer has a weight average molecular weight of at least 60,000 and a number average molecular weight of at least 12,000.

9. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the thermoplastic elastomer has a weight average molecular weight of at least 80,000 and a number average molecular weight of at least 15,000.

10. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein a weight ratio of A to B blocks is between about 15:85 to about 40:60.

11. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the isocyanate-reactive terminal groups of the A and B blocks are hydroxyl groups.

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33. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 1, wherein the at least one difunctional oligomer comprises a urethane glycol.

34. (Currently amended) A thermoplastic elastomer having A blocks and B blocks and being present in a solid state suitable for use as a binder for at least one of a propellant, explosive, and gasifier, the thermoplastic elastomer being formulated from a composition comprising, as constituents:

A blocks terminated with isocyanate-reactive groups derived from monomers comprising at least one member selected from the group consisting of 3,3-(bis(ethoxymethyl)oxetane, 3,3-bis(chloromethyl)oxetane, 3,3-bis(methoxymethyl)oxetane, 3,3-bis(fluoromethyl)oxetane), 3,3-bis(acetoxymethyl)oxetane, 3,3-bis(hydroxymethyl)oxetane, 3,3-bis(methoxyethoxymethyl)oxetane, 3,3-bis(iodomethyl)oxetane, 3,3-bis(nitratomethyl)oxetane),

3,3-bis(methylnitraminomethyl)oxetane, and 3,3-bis(azidomethyl)oxetane), the A blocks being crystalline below about 60°C;

B blocks terminated with isocyanate-reactive groups derived from monomers comprising at least one member selected from the group consisting of 3-hydroxymethyl-3-methyloxetane, 3-octoxymethyl-3-methyloxetane, 3-chloromethyl-3-methyloxetane, 3-azidomethyl-3-methyloxetane, 3-iodomethyl-3-methyloxetane, 3-propynomethylmethyloxetane, 3-nitratomethyl-3-methyloxetane, 3-methylnitraminomethyl-3-methyloxetane, tetrahydrofuran, glycidyl azide, and glycidyl nitrate, the B blocks being amorphous above about -20°C; and

linking groups derived from at least one diisocyanate for end-capping the A blocks and the B blocks and at least one difunctional oligomer comprising two functional groups which are reactive with isocyanate moieties of the at least one diisocyanate.

35. (Currently amended) -~~A~~ The thermoplastic elastomer as defined in claim 34, wherein:

the at least one diisocyanate contains a first isocyanate moiety which is at least five times more reactive with the terminal groups of the blocks than a second isocyanate moiety thereof, ~~whereby~~ wherein the more reactive first isocyanate moiety is capable of reacting with and ~~end capping~~ end-capping the terminal groups of the blocks, leaving the less reactive second isocyanate moiety free and unreacted; and

the at least one difunctional oligomer has two isocyanate-reactive hydroxyl groups which are sufficiently sterically unhindered to be reactive with the free and unreacted second isocyanate moieties of the end-capped blocks.

36. (Currently amended) -~~A~~ The thermoplastic elastomer as defined in claim 34, wherein the at least one diisocyanate comprises 2,4-toluene diisocyanate.

37. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 34, wherein the at least one difunctional oligomer comprises a reaction product of at least one diol and at least one diisocyanate, the at least one diol being selected from the group consisting of ethylene glycol, propylene glycol, butylene glycol, 1,4-cyclohexanedimethanol, and any combination thereof.

38. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 34, wherein the at least one difunctional oligomer comprises a reaction product of at least one diol and at least one diisocyanate, the at least one diisocyanate being selected from the group consisting of hexane diisocyanate, methylene-bis(4-phenyl isocyanate), phenylene diisocyanate, toluene diisocyanate, xylylene diisocyanate, and any combination thereof.

39. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 34, wherein a weight ratio of A to B blocks is between about 15:85 to about 40:60.

40. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 34, wherein the isocyanate-reactive terminal groups of the A and B blocks are hydroxyl groups.

41. (Currently amended) ~~A~~ The thermoplastic elastomer as defined in claim 34, wherein the at least one difunctional oligomer comprises a urethane glycol.

IN THE DRAWINGS:

The attached sheets of drawings include changes to FIG. 2. Specifically, FIG. 2 has been revised to rotate 180° the legends appearing on both the right-hand and left-hand sides. No new matter has been added. (See attached *formal* Replacement Sheets (FIGS. 1 and 2, 2 sheets) and Annotated Sheet Showing Changes (FIG. 2 only.)